VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY

2012 FISH TISSUE AND SEDIMENT MONITORING PLAN
WATER MONITORING AND ASSESSMENT

May 2012

Introduction

The Virginia Department of Environmental Quality (DEQ), Office of Water Monitoring and Assessment is responsible for the design and execution of the Statewide Fish Tissue and Sediment Monitoring Program. This document provides information concerning the proposed stations for monitoring fish tissue and sediment during 2012 and the rationale for the station selections.

Objective

The primary objective of the 2012 sampling event is to gather supplemental analytical chemical data for the development and/or implementation of Total Maximum Daily Load (TMDL) for segments of water bodies which have been included in previous 305(b) Report /303(d) Impaired Water Listing due to contamination of fish by polychlorinated biphenyls (PCBs). The chemical data will be used to quantify human health risks and ecological/environmental health conditions within the affected segments. The data will be assessed during the next Integrated Report for changes in water quality and further TMDL determinations. The Virginia Department of Health (VDH) will review the data to evaluate the need to revise or modify existing fish consumption advisories.

Sampling Design

For the purpose of this monitoring program, the water bodies of Virginia have been separated into fourteen river basins or subbasins (see Table 1). The 2012 sampling event is focused within two of the subbasins which have been listed as impaired due to contamination of fish tissue by polychlorinated biphenyls (PCBs).

Table 1. River Basins in Virginia.

	River Basins	Basin Code
1)	Potomac River Subbasin	1A
2)	Potomac River-Shenandoah River Subbasin	1B
3)	James River	2-
4)	Rappahannock River	3-
5)	Roanoke River	4A
6)	Yadkin River	4B
7)	Chowan-Chowan River Subbasin	5A
8)	Chowan-Albemarle Sound Subbasin	5B
9)	Tennessee and Big Sandy River-Big Sandy Subbasin	6A
10)	Tennessee and Big Sandy River-Clinch Subbasin	6B
11)	Tennessee and Big Sandy River-Holston Subbasin	6C
12)	Chesapeake Bay, Atlantic Ocean, and Small Coastal	7-
13)	York River	8-
14)	New River	9-

The monitoring sites for the 2012 sampling season will be primarily located segments in two river basins: (1) New River watershed from Claytor Lake to the Virginia/West Virginia state line

and (2) tidal James River watershed with special emphasis on the Elizabeth River drainages. A total of 38 fish tissue and/or sediment sampling stations have been proposed. Extensive effort will be made to sample all of the selected stations however unanticipated equipment problems and/or severe weather condition may impact the sampling schedule.

The sampling sites include freshwater and brackish or saltwater locations. The samples collected at each station will include three to five tissue composite samples (5-10 individuals of the same species per composites) consisting of fish species that are typically consumed by humans and/or one grab sediment sample. At least one bottom feeder (e.g. carp, gizzard shad, catfish species), which may be highly exposed to chemically contaminated sediments compared to other species, and two to four upper and middle trophic level feeders (e.g. bass and sunfish species, respectively.), which may be exposed to chemical contaminants via biomagnification.

Collection of targeted species for tissue analysis at the brackish and saltwater sites may be problematic since only 10-15% of the fish and shellfish species at the stations are year-round residents and few of the resident species are typically consumed by humans (Murdy et. al. 1997). It is likely that sample collection techniques will yield several species of migratory fish and shellfish that are consumed by humans and a few resident fish species that are not consumed by humans. Contaminants found in migratory fishes may not reflect local pollution problems but may be used to calculate human health risks from consumption. Contaminants found in resident fishes and sediment may be used to identify local inputs of bioaccumulative contaminants. Therefore, the samples collected at each brackish or saltwater station may consist of various categories of fish species including an edible migratory, an edible or non-edible resident, and an edible or non-edible bottom feeder. For a detailed list of species that will be targeted at each brackish or saltwater station, see Table 2.

Table 2. Target species at each of the brackish water or saltwater stations.

Migratory Fish (Normally consumed by humans)	Resident Fish (Some may not be consumed by humans)	Benthic Fish/Shellfish (Some may not be consumed by humans)
Striped Bass	White Perch	Oyster spp.
Spot	Yellow Perch	Clam spp.
Atlantic Croaker	Killifish, Banded	Blue Crab
Weak Fish	Killifish, Striped	Summer Flounder
Black Sea Bass	Killifish,Rainwater	Smallmouth Flounder
Spotted Seatrout	Killifish, Marsh	Oyster Toadfish
Black Drum	Killifish, Spotfin	Hogchoker
Red Drum	Mummichogs	Tongue Fish
Silver Perch	Sheepshead Minnow	Channel Catfish
Northern Kingfish	Silverside, Inland	White Catfish
Southern Kingfish	Silverside, Rough	
Gulf Kingfish	Silverside, Atlantic	
Bluefish	Bay Anchovy	
Hickory Shad		
Alewife		
American Shad		
Blueback Herring		

The entire data set should help determine if any unacceptable human health risks are associated with fish consumption, and if local inputs of bioaccumulative contaminants are in

tissue and/or sediment at levels of concern.

The fish tissue and sediment samples will be analyzed for PCBs by contract laboratory at the College of William and Mary - Virginia Institute of Marine Science (VIMS).

Station Selection Criteria

The stations in each basin have been selected to produce site specific conclusions and provide spatial coverage of the affected segment of each watershed. The following criteria were used to select the 2012 sampling stations:

- Specific Water Quality Problems
- Historical Data Review
- Spatial Distribution
- Major Tributary Status
- Point Source Input
- Nonpoint Source
- Major Fishery
- External Request from other VADEQ offices, State Agencies, and Citizen Groups

The river mile, station name, latitude, longitude, topo quad name, locality, number of sediment and water body ID number for each proposed sampling station are provided in Table 3. Summary maps showing the locations of all of the proposed fish tissue sampling sites are presented on Figures 1-4.

Sample Collection and Reporting

Fish tissue and sediment samples will be collected in the spring through late fall, 2012. Analytical data for all of the samples should be received from the laboratory by the end of June 2013.

The data will assist in the development and/or implementation of TMDL for the selected watersheds.

Additionally, the data will be tabulated as received and submitted to VDH per an October 2000 Memorandum of Agreement between the VDH and DEQ. VDH will make an evaluation regarding potential human health impacts due to consumption of contaminated fish and amend existing fish consumption advisories as needed.

The tabulated data will also be sent to the water quality monitoring and assessment staff for review and assessed for 305(b) reporting, and posted on the DEQ web site at: Fish Tissue Results for use by the citizens of the Commonwealth and the public at large.

References

Department of Environmental Quality. 2008. Virginia Water Quality Assessment. 2008 305 (b) Report to EPA Administrator and Congress for the Period January 1, 2001 To December 31, 2006. Richmond, Virginia

Department of Environmental Quality. 2006. Virginia Water Quality Assessment. 2006 305 (b) Report to EPA Administrator and Congress for the Period January 1, 2000 To December 31, 2004. Richmond, Virginia

Department of Environmental Quality. 2004. Virginia Water Quality Assessment. 2004 305 (b) Report to EPA Administrator and Congress for the Period January 1, 1998 To December 31, 2002. Richmond, Virginia

Department of Environmental Quality. 2003. Virginia Water Quality Assessment. 2002 305 (b) Report to EPA Administrator and Congress for the Period January 1, 1996 To December 31, 2000. Richmond, Virginia.

Department of Environmental Quality. 2002. Virginia 303 (d) TMDL Priority List. October 2002. Richmond, Virginia.

Department of Environmental Quality. 2008-1975. Statewide Fish Tissue and Sediment Monitoring Program Data Files. Richmond, Virginia.

Department of Environmental Quality. 2000. Virginia Water Quality Assessment. 2000 305 (b) Report to EPA Administrator and Congress for the Period January 1, 1994 To December 31, 1998. Richmond, Virginia.

Department of Environmental Quality. 1998. Quality Assurance/Quality Control Project Plan for the Fish Tissue and Sediment Monitoring Program. Richmond, Virginia.

Memorandum of Agreement between the Virginia Department of Health and the Virginia Department of Environmental Quality for the Timely Transmission of Fish Consumption Advisory Information. October 2000.

Murdy, O.M., Ray S. Birdsong, J.A. Musick. 1997. Fishes of the Chesapeake Bay. Smithsonian Institute Press. Washington and London.

Table 3: 2012 proposed sampling sites

RIVER MILE fish	STATION NAME	LATITUDE (deg_decimal min)	LONGITUDE	LATITUDE (decimal deg)	LONGITUDE	TOPO QUAD NAME	LOCALITY	RIVER MILE sediment	SEDIMENT Channel/Shoal	WBID
	"lower" New River watershed									
9-NEW030.15	New River near Glen Lyn	N37° 22.337'	W80° 51.693'	37.372283	-80.861550	Narrows	Giles	9-NEW030.15	1	W-N29R
9-NEW038.71	New River below Celanese	N37° 20.91116(	W80° 46.515	37.348519	-80.775250	Narrows	Giles	9-NEW038.71	1	W-N29R
9-NEW050.70	New River near Pembroke	N37° 18.893	W80° 38.607	37.315000	-80.643000	Pearisburg	Giles	9-NEW050.70	1	W-N25R
9-NEW066.90	New River near Whitethorne	N37° 11.891'	W80° 33.800'	37.198183	-80.563333	Radford North	Pulaski	9-NEW066.90	1	W-N22R
9-NEW079.19	New River downstream Radford University	N37° 08.538'	W80° 32.567'	37.142000	-80.543000	Radford North	Pulaski	9-NEW079.19	1	W-N18R
9-NEW085.94	New River downstream Claytor Lake Dam	N37° 05.270'	W80° 34.770'	37.087833	-80.579500	Radford South	Pulaski	9-NEW085.94	1	W-N18R
9-WLK008.22	Walker Creek near Rt. 100 Gaging Station	N37° 16.158'	W80° 42.524	37.269300	-80.708733	Pearisburg	Giles	9-WLK008.22	1	W-N25R
9-WFC003.69	Wolf Creek near Rt. 724 Gaging Station	N37° 18.362'	W80° 50.992'	37.306033	-80.849867	Narrows	Giles	9-WFC003.69	1	W-N32R
	"upper" New River - Claytor Lake watershed									
9-NEW088.86	New River near Claytor Lake Dam	N37° 04.468'	W80° 35.272'	37.074467	-80.587867	Radford South	Pulaski	9-NEW088.86	1	W-N18R
9-NEW099.90	New River near Rt. 672 at Claytor Lake	N37° 00.155'	W80° 40.944'	37.002583	-80.682400	Dublin	Pulaski	9-NEW099.90	1	W-N18R
9-PKC004.65	Peak Creek near Claytor Lake	N37° 02.883'	W80° 42.457'	37.048050	-80.707617	Dublin	Pulaski	9-PKC004.65	1	W-N16L
9-PKC007.82	Peak Creek near Rt. 99 bridge	N37° 02.518'	W80° 44.496'	37.041967	-80.741600	Dublin	Pulaski	9-PKC007.82	1	W-N16R
9-RDC009.00	Reed Creek near Rt. 619 at Grahams Forge	N36° 55.912'	W80° 53.655'	36.939100	-80.886900	Max Meadows	Wythe	9-RDC009.00	1	S-N11R
9-NEW120.38	New River near I-77 bridge	N36° 52.282'	W80° 52.338'	36.871000	-80.872000	Sylvatus	Wythe	9-NEW120.38	1	S-N08R
	"lower" James River watershed									
2-JMS013.10	James River near Rt. 17	N36° 59.224'	W76° 27.077'	36.987067	-76.451283	Newport News South	Newport News City	2-JMS013.10/.11	2	T-G11E
2-JMS040.03	James River off southern tip of Jamestown Island	N37° 11.126'	W76° 45.260'	37.185433	-76.754333	Surry	James City	2-JMS040.03	2	T-G10E
2-JMS052.67	James River near Chippokes Pt., Buoy 71	N37° 14.59	W76° 58.95	37.243167	-76.982500	Claremont	Surry	2-JMS052.67	2	P-G04E
2-JMS066.88	James River near Windmill Point	N37° 18.650'	W77°° 05.590'	37.310833	-77.093167	Charles City	Charles City	2-JMS066.88/89	2	P-G04E
2-JMS074.44	James River near Jordan Point, Rt. 156	N37° 19.023'	W77°° 13.417'	37.317050	-77.223617	Westover	Prince George	2-JMS074.44/45	2	P-G03E
2-JMS087.01	James River near Buoy 137	N37° 21.45	W77° 18.16666	37.357500	-77.302778	Hopewell	Chesterfield	2-JMS087.01/.02	2	P-G02E
2-JMS110.00	James River near I-95 bridge	N37° 31.671'	W77°° 25.859'	37.527850	-77.430983	Richmond	Richmond City	2-JMS110.00	1	P-H39R
2-APP001.53	Appomattox River near Hopewell Yacht Club Rt. 10	N37° 18.711'	W77°° 17.806'	37.311850	-77.296767	Hopewell	Hopewell City	2-APP001.53	1	P-J15E
2-CHK002.17	Chickahominy River near Rt. 5	N37° 15.806'	W76° 52.625'	37.263433	-76.877083	Brandon	James City			P-G08E
	"lower" James River watershed (PRO requests)									
2-JMS057.69	James River near Bachelor Point, Buoy 74A	N37° 17.916'	W76° 59.550'	37.298600	-76.992500	Brandon	Charles City			P-G04E
2-JMS097.77	James River near Buoy 156	N37 23.086	W77 22.995	37.384767	-77.383250	Drewrys Bluff	Henrico			P-G02E
2-PTH000.23	Poythress Creek near Station Street	N37° 18.477'	W77° 16.291'	37.307950	-77.271517	Hopewell	Hopewell City			P-G03E
2-BLY000.65	Bailey Creek near Rt. 10 bridge	N37° 17.290'	W77° 15.558'	37.288167	-77.259300	Hopewell	Hopewell City			P-G03E
	Elizabeth River watershed									
2-DEC000.54	Deep Creek near I-64	N36° 45.758'	W76° 18.482'	36.762633	-76.308033	Norfolk South	Chesapeake City			T-G15E
2-SBE006.26	Southern Branch Elizabeth River off Virginia Power	N36° 45.9000	W76° 18.0000	36.765000	-76.300000	Norfolk South	Chesapeake City	2-SBE006.26/27	2	T-G15E
2-PAR001.77	Paradise Creek off George Washington bridge	N36° 48.58383	W76° 19.02366	36.809731	-76.317061	Norfolk South	Portsmouth City			T-G15E
2-STJ000.81	St. Julian Creek	N36° 46.968'	W76° 19.290'	36.782800	-76.321500	Norfolk South	Chesapeake City			T-G15E
2-EBE002.98	Eastern Branch Elizabeth River near Norfolk & Western RR b	N36° 50.16666	W76° 14.66666	36.836111	-76.244444	Kempsville	Chesapeake City	2-EBE002.97/98	2	T-G15E
2-BRO001.35	Broad Creek near Rt. 58	N36° 51.404	W76° 13.690	36.856733	-76.228167	Kempville	Norfolk City			T-G15E
2-LAF003.83	Lafayette River near Granby Street bridge	N36° 53.36166	W76° 16.88666	36.889361	-76.281444	Norfolk North	Norfolk City	2-LAF003.83/84	2	T-G15E
2-WBE002.11	Western Branch Elizabeth River near Rt. 17 bridge on Church	N36° 50.592'	W76° 21.758'	36.843200	-76.362633	Norfolk South	Portsmouth City	2-WBE002.11/12	2	T-G15E
2-ELI004.79	Elizabeth River near U S Naval Degaussing Station	N36° 51.935	W76° 19.73833	36.865583	-76.328972	Norfolk South	Portsmouth City			T-G15E
2-ELI000.69	Elizabeth River near Craney Island	N36° 55.283'	W76° 20.177'	36.921383	-76.336283	Norfolk North	Norfolk City	2-ELI000.69/.68	2	T-G15E
	Outside mouth of James River							2-ZZZ000.00	1	

37 <---- 33 fish sites + 4 PRO (yellow highlight denotes low priority) sediment sites ---> 39

Fig. 1: lower New River sites (1" = 3.2 mi)

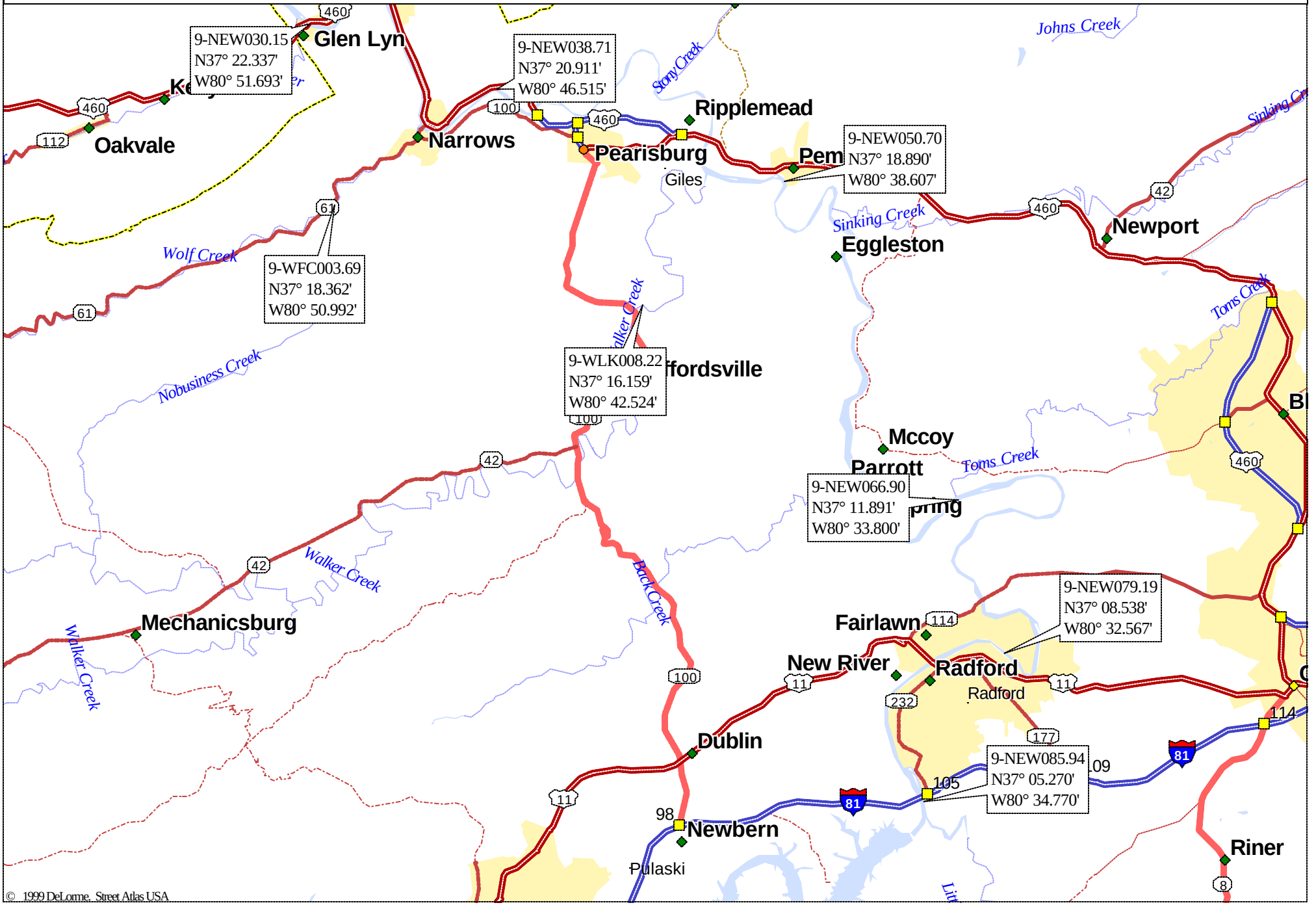

Fig. 2: New River - Claytor sites (1" = 2.4 mi)

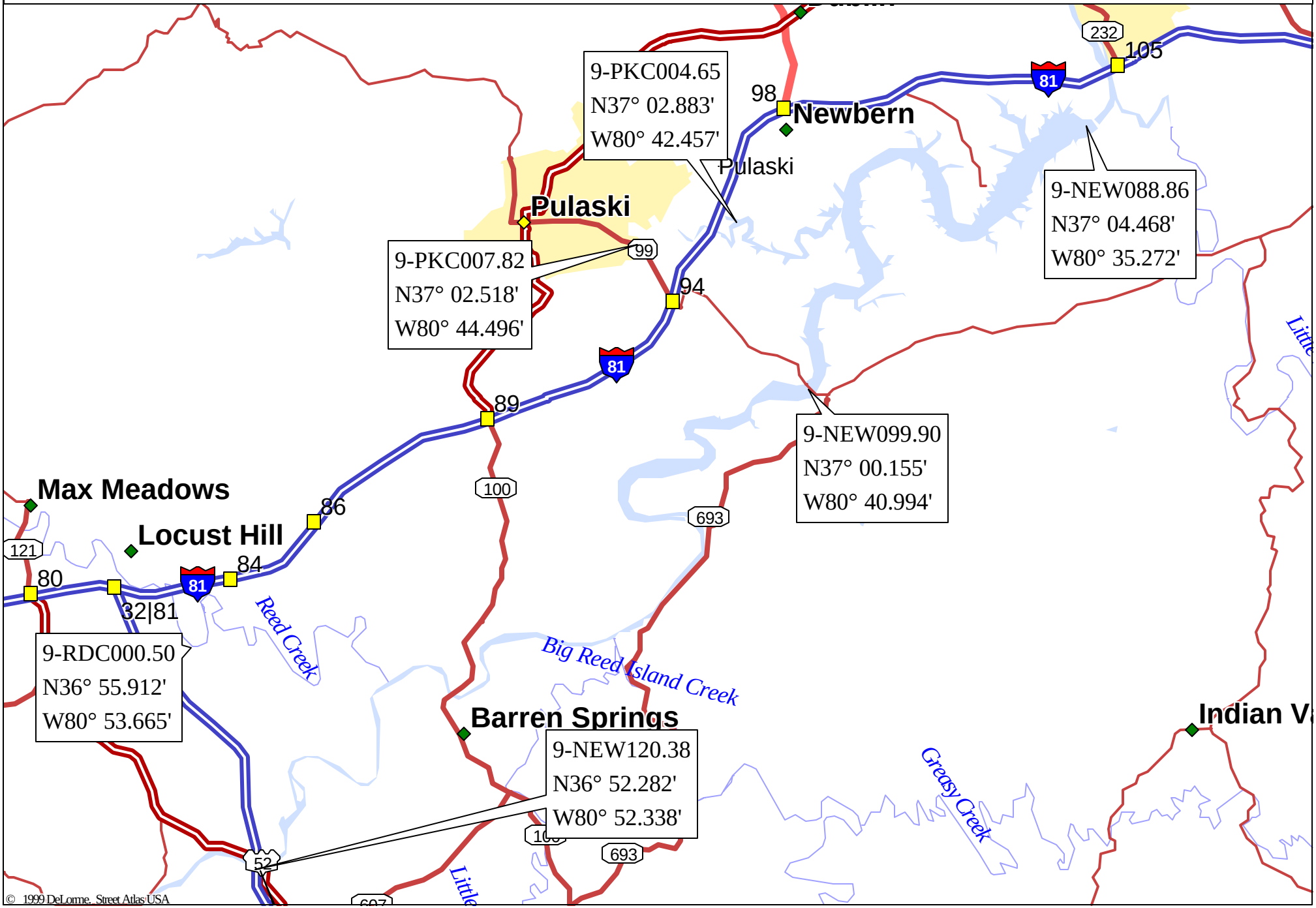

Fig. 3: lower James River sites (1" = 6.3 mi)

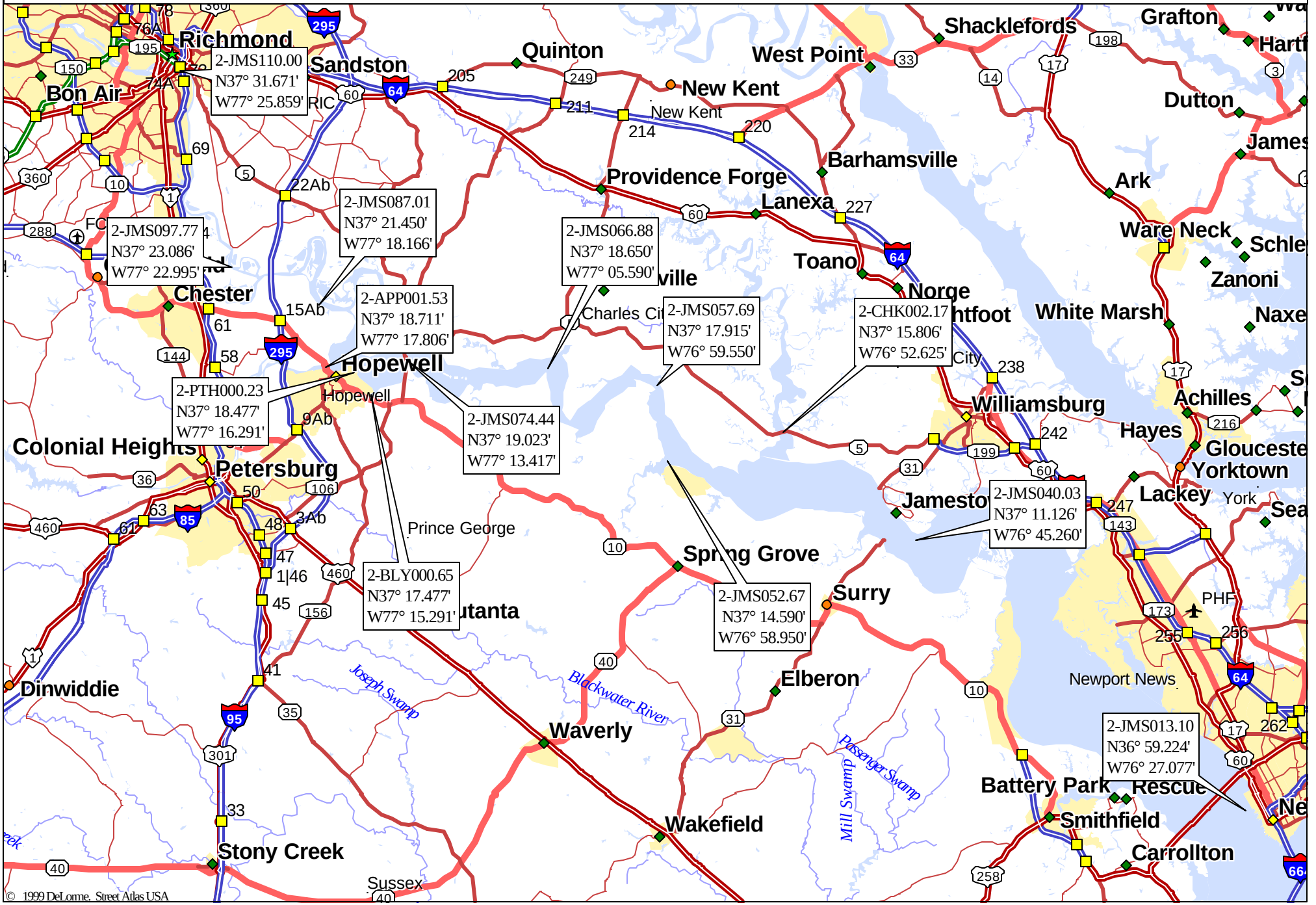

Fig. 4: Elizabeth River sites (1" = 2.4 mi)